
Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under internal pressure

Systèmes de canalisations en plastique — Assemblages mécaniques entre raccords et tubes sous pression — Méthode d'essai pour l'étanchéité sous pression interne





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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastics materials and their accessories — Test methods and basic specifications*.

This second edition cancels and replaces the first edition (ISO 3458:1976), which has been technically revised. The reason for modification is for applicability to other plastics materials, other sizes and/or other test conditions and alignment with texts of other International Standards on test methods. This edition of ISO 3458 is prepared under Vienna Agreement, so that the content is also aligned with the EN 715:1994, which will be replaced.

The modifications are the following:

- no material is mentioned;
- test parameters are omitted, although the original test parameters can be found in [Annex A](#);
- the diameter limit is removed;
- no requirements are given;
- editorial changes have been introduced.

Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under internal pressure

WARNING — Users of this International Standard should be familiar with normal laboratory practice, if applicable. The use of this International Standard might involve hazardous materials, operations, and equipment. This International Standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies the method of test for checking the leak tightness of assembled joints between mechanical fittings and plastic pressure pipes. The test applies regardless of the design and material of the fitting used for jointing plastic pipe.

This test method is not applicable to fusion-welded joints.

2 Principle

The leak tightness of an assembled joint is checked while the joint is subjected to an internal test pressure greater than the nominal pressure for which the pipe is rated with the pieces joined subject to the longitudinal force, induced by the hydrostatic end thrust.

3 Test parameters and requirements

The test parameters of the standard which refers to this test standard shall be used and the requirements shall be fulfilled. If one or more parameters are not given in the referring International Standard, the ones given in [Annex A](#) shall apply.

The following test parameters should be given by the standard which refers to this test standard:

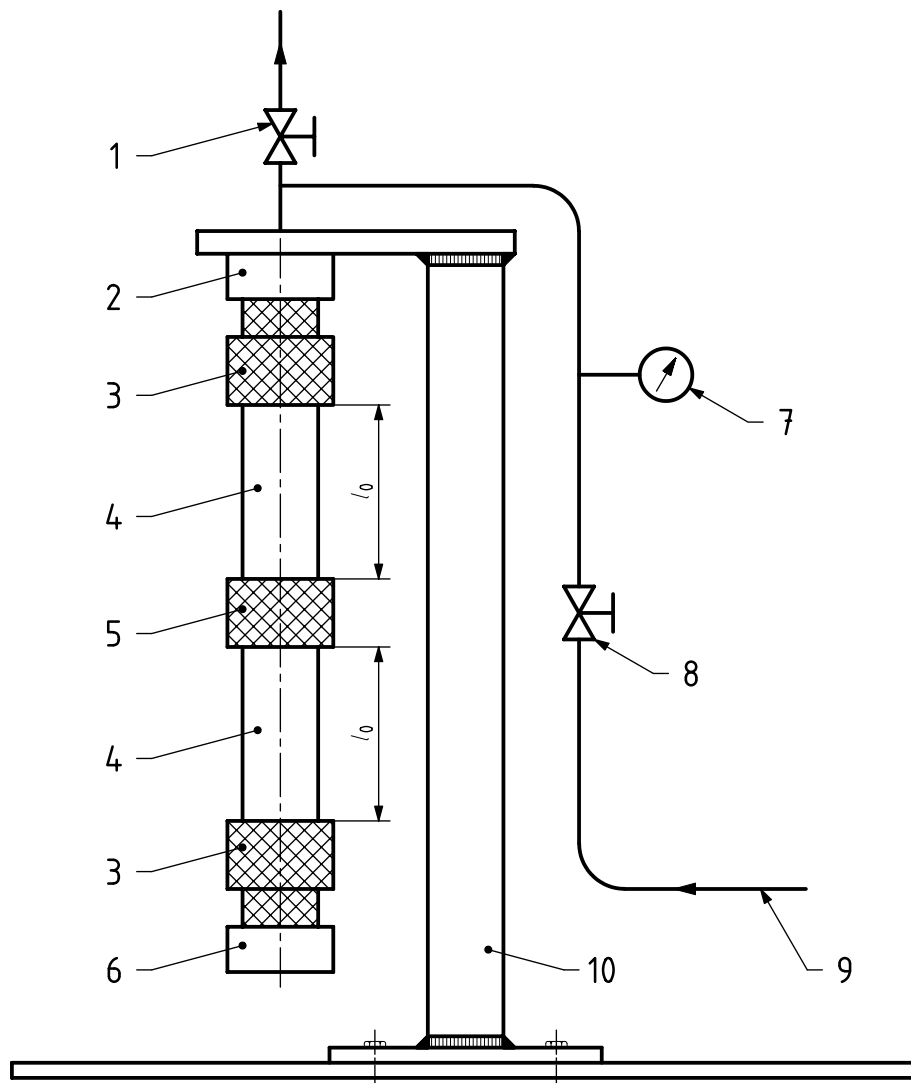
- a) test medium;
- b) test pressure (bar or MPa);
- c) test duration (h);
- d) test temperature (°C);
- e) free length (mm).

4 Apparatus

4.1 A suitable apparatus is shown in [Figure 1](#).

4.2 Pressure source connected to the test specimens, capable of maintaining for at least 1 h a minimum water or air pressure to an accuracy of ± 2 %.

4.3 Pressure measuring device (7), capable of checking performance of the test pressure with [4.2](#).



Key

- 1 air release valve
- 2 connecting element
- 3 fitting to be tested
- 4 pipe piece
- 5 fitting (option) to be tested
- 6 endcap
- 7 pressure measuring device
- 8 valve
- 9 connection pressure source
- 10 supporting frame
- l_0 pipe free length

Figure 1 — Diagram of typical apparatus

NOTE If the test is performed in a water bath, pressure equipment for detecting leakage is optional.

5 Test pieces

The test specimen shall consist of one or more joints formed by the assembly of at least one fitting and one or more pieces of plastic pressure pipe of the size and quality for which the fitting is designed.

The fittings and pipes shall not be tested until 24 h after their production. For practical reasons, the manufacturer can wait a shorter time before testing. In case of dispute, a duration of 24 h shall apply.

One end of the test specimen shall be connected to the pressure source. The other end(s) shall be sealed off in such a way that, when the test pressure is applied, longitudinal stresses are exerted within the pipe wall due to the pressure acting on the end fittings.

The assembly of the joint should be carried out in accordance with the manufacturer's instructions.

6 Procedure

Fill the test specimen with water or air at the specified test temperature. If water is used as test medium ensure all air is removed and excluded from the test piece for the remainder of the procedure.

Secure the test specimen to the apparatus. Minimum conditioning times are given in [Table 1](#).

Table 1 — Conditioning periods

Nominal wall thickness of the pipe mm	Minimum conditioning period min
$e \leq 10$	20
$10 < e \leq 20$	60
$20 < e$	120

If water is used as test medium and the test is carried out in air, ensure that the outside of the test specimen is completely dry.

After conditioning, progressively and smoothly apply the specified test pressure in the shortest time practicable. The test starts on achieving the required test pressure.

Maintain the specified temperature within ± 2 °C, and pressure within ± 2 %, while monitoring the apparatus for any indication of a loss of pressure and the test piece for any signs of leakage for the specified time or until failure as follows:

- a) terminate the test and record the observations if during the period the pressure cannot be maintained and the losses occurred at the joint, or within a distance of one pipe diameter from the joint under test;
- b) repeat the test if the pipe(s) fail(s) at a position further than one diameter from the joint(s) under test.

If air is used as test medium, leakage can be detected with leak detection fluid.

7 Test report

The test report shall include the following information:

- a) a reference to this International Standard (e.g. ISO 3458) and to the referring International standard;
- b) the nominal pressure class or S series of the components [e.g. fitting(s), pipe] comprising the joint(s) under test;
- c) all details necessary for identification of the test pieces, including the nominal size of the pipes and fittings used to produce the test pieces, the type of material and the manufacturer's code;

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- d) the free length;
- e) the test medium;
- f) the test period;
- g) the test pressure;
- h) the test temperature;
- i) the information on the leak tightness of the joint including the pressure at which a leakage occurred (if any);
- j) any factors which may have affected the results, such as any incidents or any operating details not specified in this International Standard;
- k) the date of test.



Annex A (normative)

Test parameters

The test parameters in [Table A.1](#) shall be used, if applicable.

Table A.1 — Test Parameters

Test medium	Test duration h	Test temperature °C	Test pressure MPa
Water	1	20	Three times the nominal design pressure of the lowest rated component in the assembly

The free length, l_0 , of each pipe shall be at least three times the nominal outside diameter, d_n , with a minimum of 250 mm.

If, for pipes with d_n greater than 315 mm, the specified minimum free length cannot be achieved, a shorter free length may be chosen with a minimum of two times d_n , unless otherwise specified in the referring International Standard or specification.

